Stoller
Hanford Office

DOE-EM/GJ1332-2006

299-E33-59 (A6867)
Log Data Report

Borehole Information:

Borehole:	299-E33-59 (A6867)		Site:	216-B-7A & B Cribs	
Coordinates (WA St Plane)		GWL[1] (ft) :	None	GWL Date:	N/A
North	East	Drill Date	Elevation (TOC)	Total Depth (ft)	Type
137388.471	573797.285	02/47	654.37	150	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	1.1	8 5/8	8	0.322	1.1	153

Borehole Notes:

A Log Data Report for this borehole has been previously issued in 2002. This report is an update based on additional logging conducted in April, 2006. The current logging effort is made to re-log the portion of the borehole from 0 to 60 ft to assess any changes that may have occurred in uranium or ^{137}Cs concentrations since 2002.

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 1N		Type:	SGLS (60%) SN: 45-TP22010A
Effective Calibration Date:	04/05/06	Calibration Reference:	DOE/EM-GJ1183-2006	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3		
Date	04/24/06	04/24/06	04/24/06		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	60.0	31.0	11.0		
Finish Depth (ft)	30.0	10.0	1.0		
Count Time (sec)	200	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	0.5	0.5	0.5		
ft/min	N/A[2]	N/A	N/A		
Pre-Verification	AN013CAB	AN013CAB	AN014CAB		
Start File	AN013000	AN013061	AN014000		
Finish File	AN013060	AN013082	AN014010		
Post-Verification	AN013CAA	AN013CAA	AN014CAA		
Depth Return Error (in.)	N/A	- 1	0		
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment		

Logging Operation Notes:

Logging was conducted with a centralizer on the sonde. Measurements are referenced to the top of casing.

Analysis Notes:

Analyst:	Henwood	Date:	09/18/06	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging system were performed before and after each day's data acquisition. Acceptance criteria were met. However, the lower control limits for efficiency for the after verification on April 24, 2006 were exceeded. When compared with the before verification data, a loss of efficiency of approximately 12 percent occurred during the day's data acquisition. This efficiency loss would result in slightly lower concentrations being calculated.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet template identified as G1NApr06.xls. A casing correction for 0.322-in.-thick casing was applied to the SGLS data. This casing thickness is the same used to correct the 2002 data.

Results and Interpretations:

Manmade radionuclides detected in this borehole for the current logging event (between 0 and 60 ft) are ^{238}U, ^{235}U, and ^{137}Cs. The original SGLS logging event in 2002 also detected these contaminants.

^{137}Cs is detected at a maximum concentration of approximately 1000 pCi/g. Comparison of the current data with ^{137}Cs data acquired in 2002 indicates a consistent contamination profile and suggests no changes have occurred.

Evidence of processed uranium (^{238}U and ^{235}U) exists between 37 and 60 ft. ^{238}U concentrations are determined by the ^{234m}Pa energy peak at 1001 keV. ^{235}U is directly measured by the 185.72 keV energy peak. The maximum concentrations for ^{238}U and ^{235}U are 54 and 2 pCi/g, respectively. Even though ^{235}U is not detected at each depth interval ^{238}U is detected, it is virtually certain they exist together as they behave chemically the same. It should be assumed the processed uranium exists in the high ^{137}Cs activity interval between approximately 33 and 37 ft at levels above the reported minimum detection limit (MDL).

It was reported in 2002 that processed uranium existed between 41 and 53 ft. The maximum concentrations for ^{238}U and ^{235}U were reported at approximately 25 and 3 pCi/g, respectively. The discrepancies between the 2002 and 2006 uranium data are the result of the 2002 concentrations being near the respective MDLs. The 2006 log data were acquired using a more efficient detector (60% vs 35%) and longer counting times (200 s vs 100 s) between 30 and 60 ft than in 2002. These changes result in better counting statistics for the 2006 data. Thus, there are more depth intervals that indicate processed uranium, and the improved MDL in the high ^{137}Cs activity interval, allowed for a higher concentration (i.e., 54 pCi/g ^{238}U) to be measured. **These changes do not reflect contaminant movement in the vadose zone.**

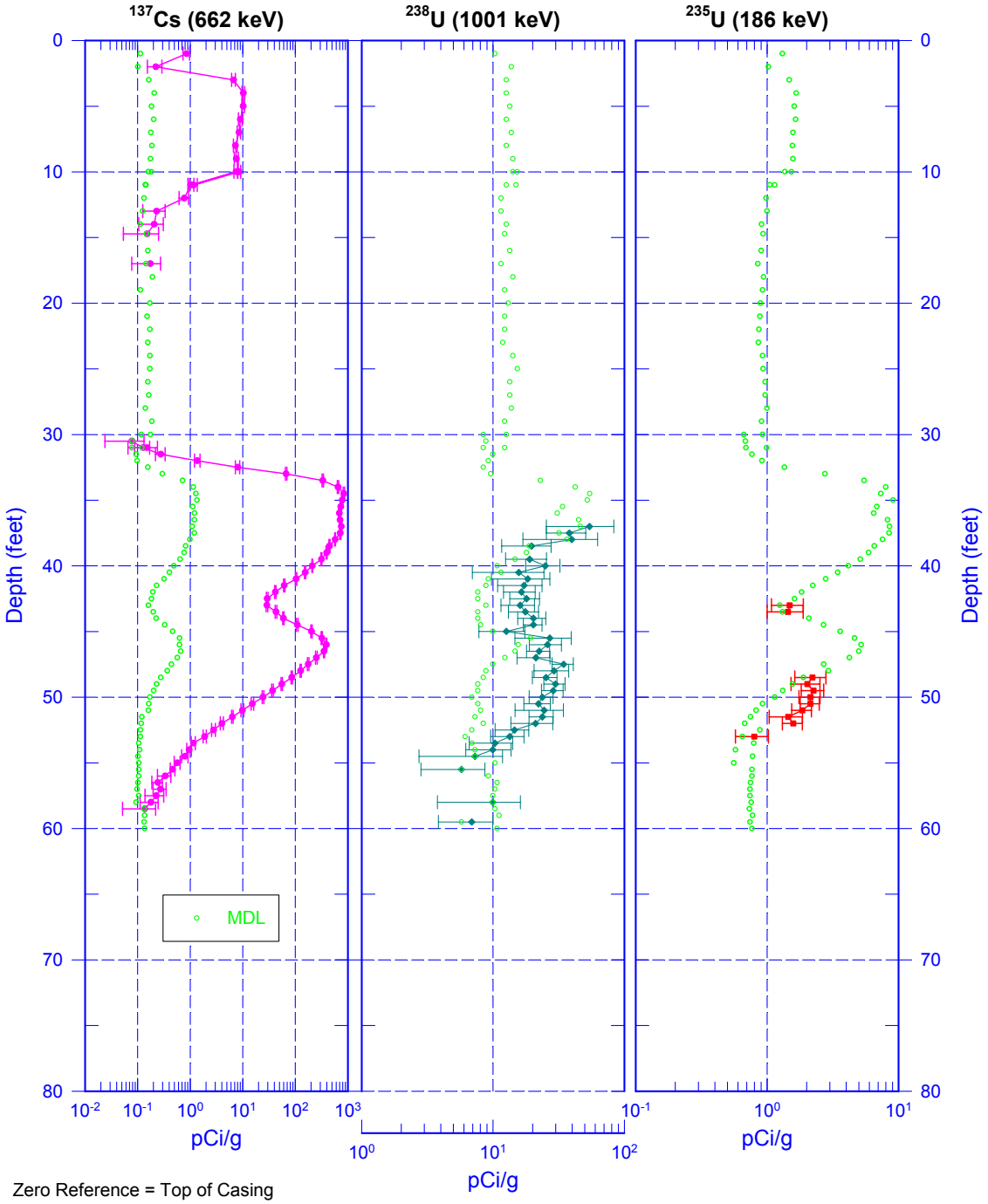
List of Plots:

Depth Scale 1" = 10 ft except for the second Combination Plot (1" = 20 ft)
Depth Reference = Top of Casing

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot (0-60 ft)
Combination Plot (0-120 ft)
Total Gamma & Dead Time
SGLS 2002/2006 Comparison of Manmade Radionuclides

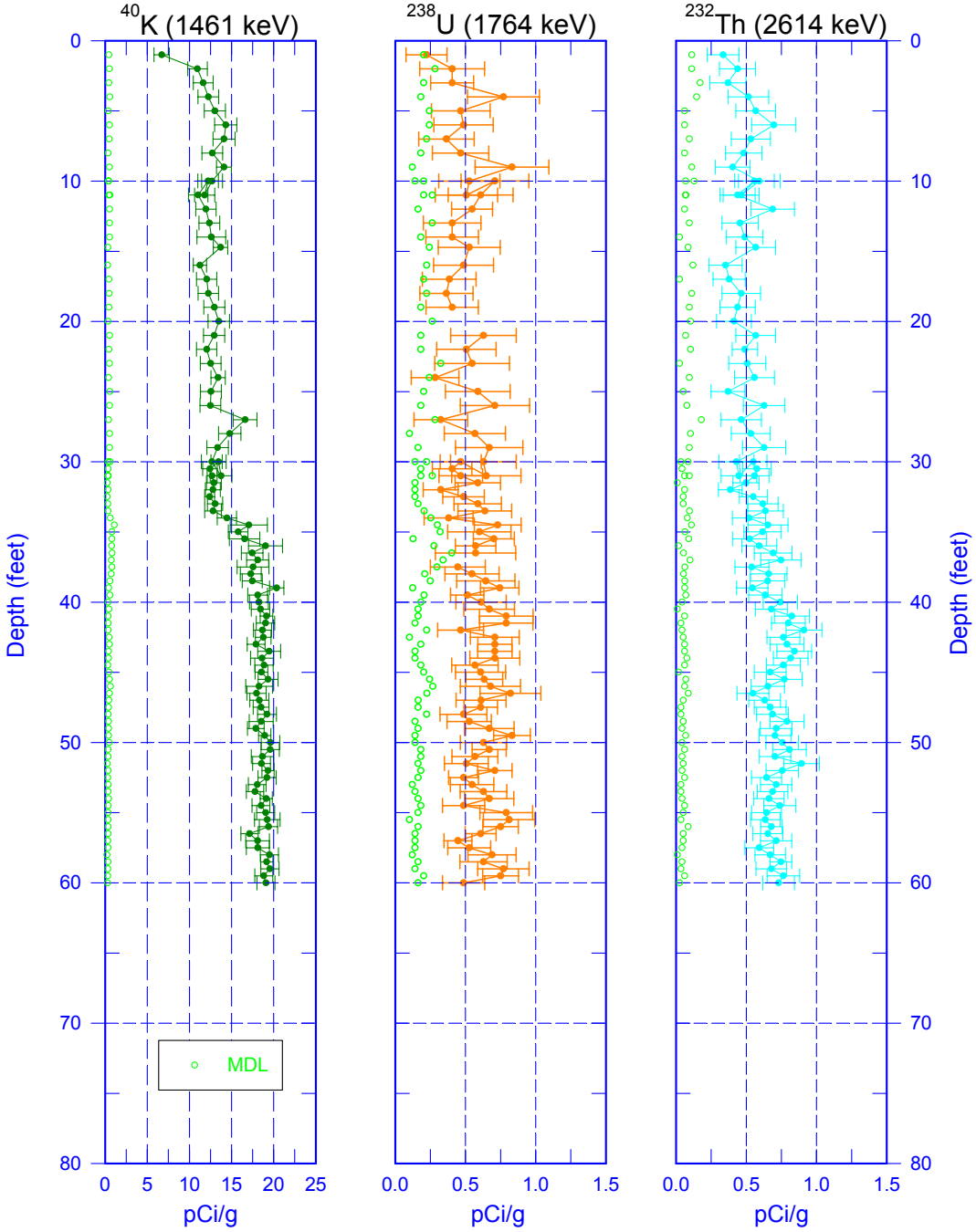
[1] GWL – groundwater level
[2] N/A – not applicable

299-E33-59 (A6867)
Manmade Radionuclides



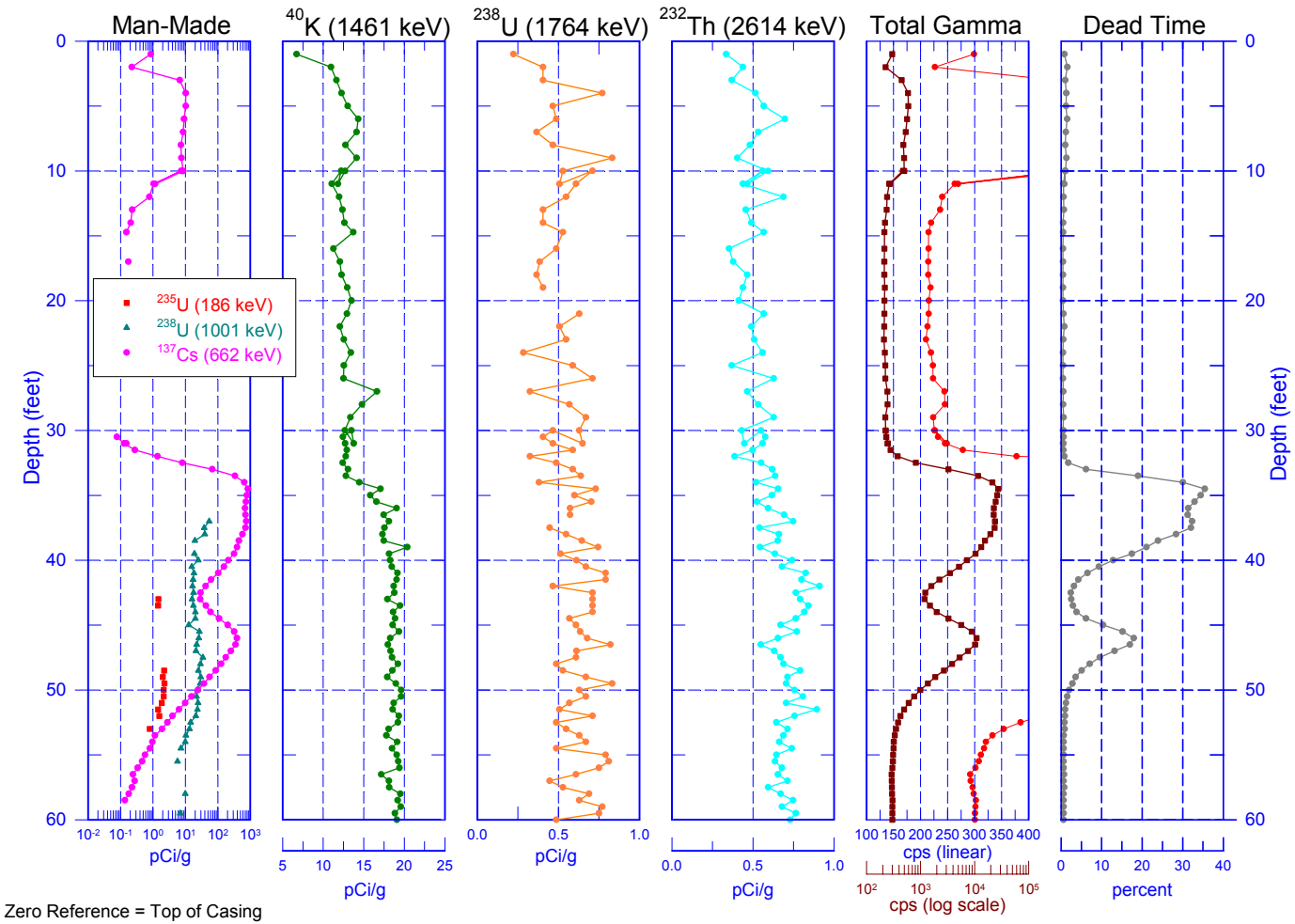
Zero Reference = Top of Casing

299-E33-59 (A6867)
Natural Gamma Logs



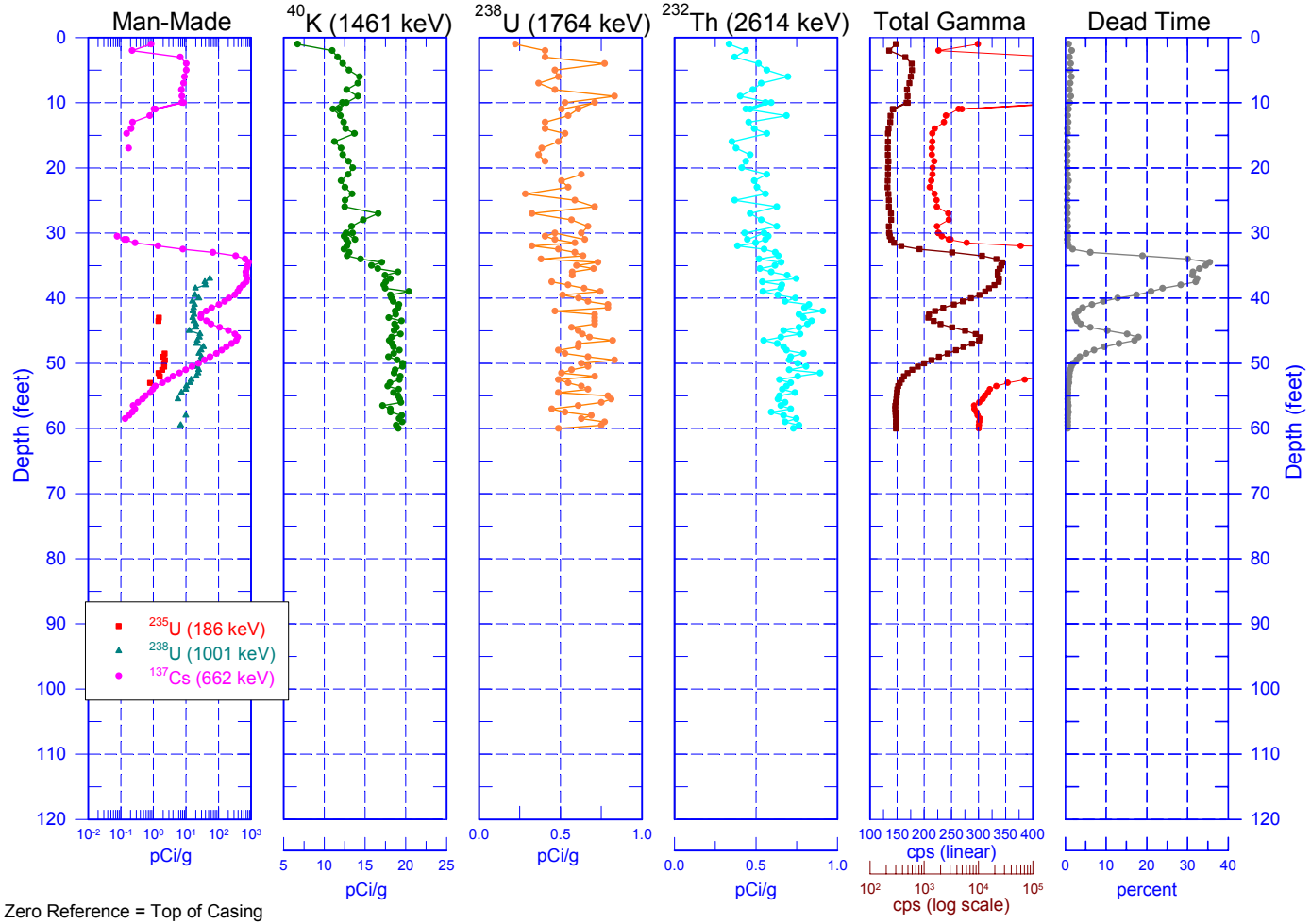
Zero Reference = Top of Casing

299-E33-59 (A6867) Combination Plot



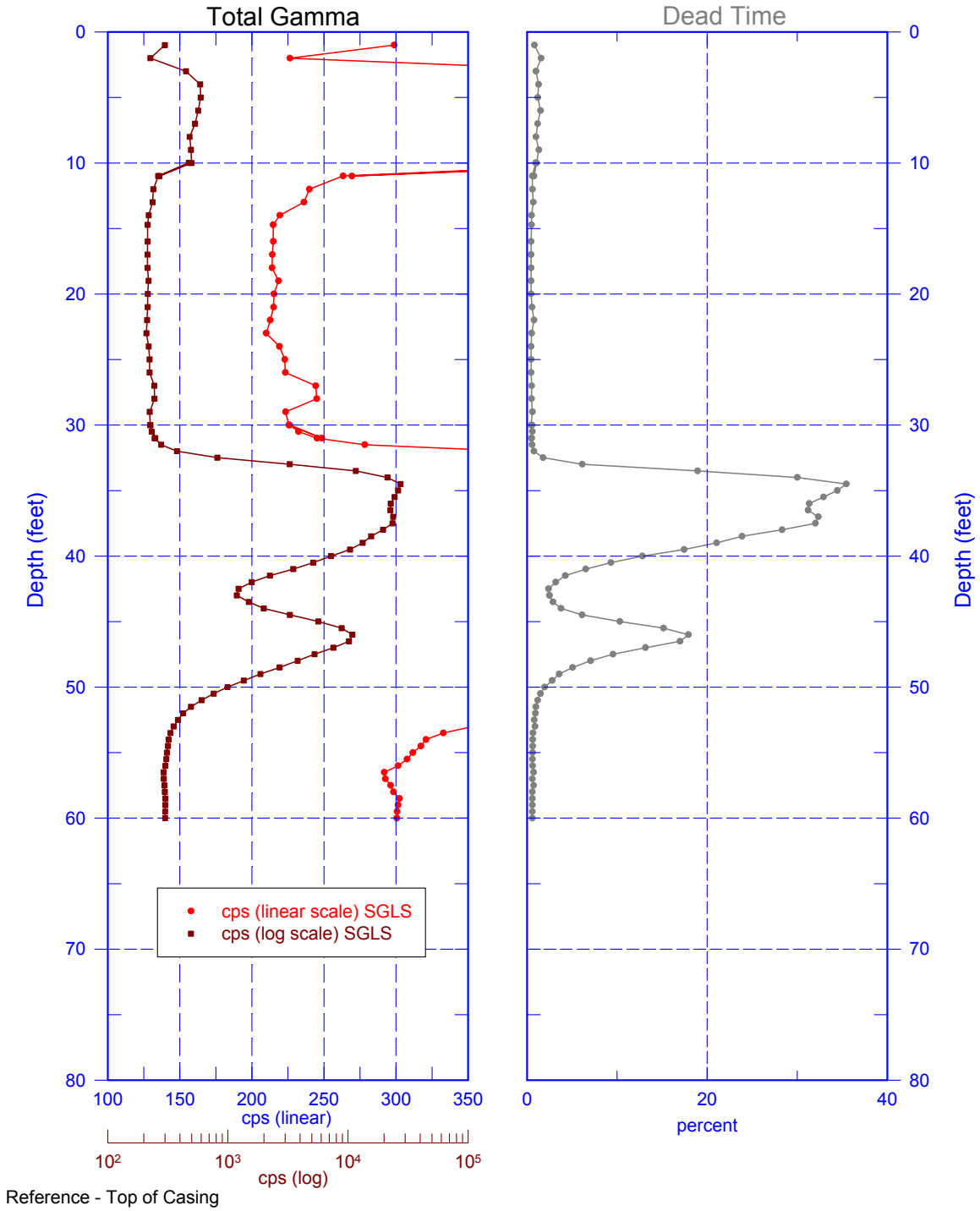
Zero Reference = Top of Casing

299-E33-59 (A6867) Combination Plot



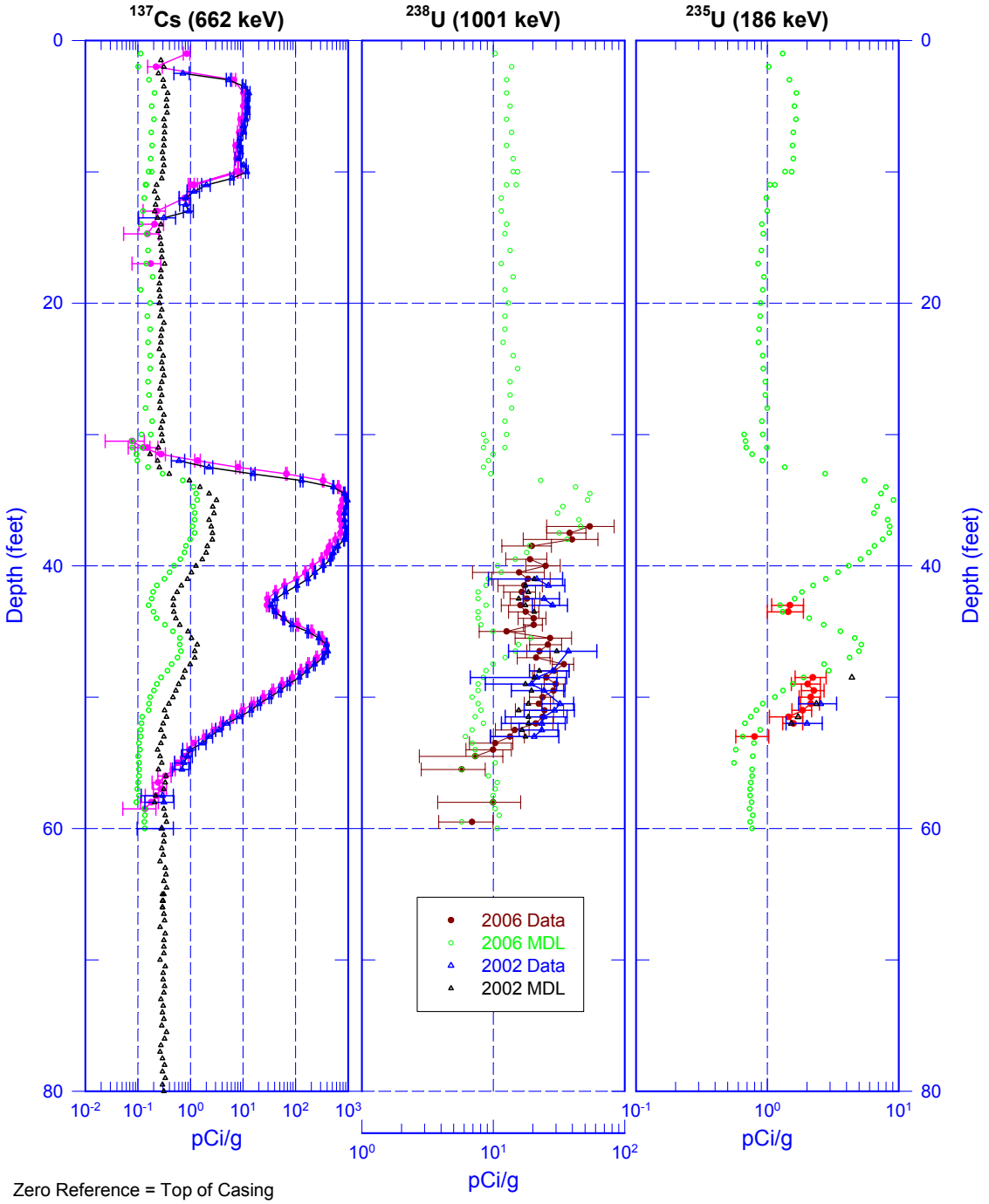
Zero Reference = Top of Casing

299-E33-59 (A6867)
Total Gamma & Dead Time



Reference - Top of Casing

299-E33-59 (A6867)
SGLS 2002/2006 Comparison of Manmade Radionuclides



Zero Reference = Top of Casing